

WHAT IS CLAIMED IS:

1. An illumination module for transmitting radiation from a radiation source to the interior of a vessel, said module comprising:

a mounting member including a leading end, a trailing end, an outer surface connecting said leading and trailing ends, a passage extending through said mounting member from said leading end to said trailing end, and a guide hole extending through said mounting member from said outer surface to said passage for communication with said passage; and

10 a radiation guide having a radiation entry end for communication with said radiation source and a radiation exit end, said radiation guide being arranged to extend from said radiation entry end through said guide hole into said passage and along said passage in the direction of said leading end, said radiation guide terminating at said radiation exit end.

2. The illumination module according to claim 1, wherein the cross-sectional area of said passage that is unblocked by said radiation guide is greater than the cross-sectional area of said passage that is blocked by said radiation guide to facilitate viewing through said passage.

20 3. The illumination module according to claim 1, wherein there is a plurality of said guide holes and a plurality of corresponding radiation guides.

4. The illumination module according to claim 3, wherein the cross-sectional area of said passage that is unblocked by said plurality of radiation guides is greater than the cross-sectional area of said passage that is blocked by said plurality of radiation guides to facilitate viewing through said passage.

5. The illumination module according to claim 1, wherein said leading end and said trailing end of said mounting member are planar surfaces parallel to one another.

6. The illumination module according to claim 1, wherein said radiation guide includes a housing, and said radiation exit end of said radiation guide includes a glass window fused to said housing.

7. The illumination module according to claim 6, wherein said mounting member and said housing include a fine flow duct system communicating with at least one spray port directed at said fused glass window, whereby fluid is delivered for cleaning said fused glass window.

8. An illumination and viewing assembly comprising:
a mounting member including a leading end, a trailing end, an outer surface connecting said leading and trailing ends, a passage extending through said mounting member from said leading end to said trailing end, and a guide hole extending through said mounting member from said outer surface to said passage for communication with said passage;

20 a radiation guide having a radiation entry end and a radiation exit end, said radiation guide being arranged to extend from said radiation entry end through said guide hole into said passage and along said passage in the direction of said leading end, said radiation guide terminating at said radiation exit end;

a radiation source connected to said radiation entry end; and
a sight glass in sealed adjacency to said trailing end of said mounting member and in alignment with said passage.

9. The assembly according to claim 8, wherein the cross-sectional area of said sight glass that is unblocked by said radiation guide is greater than the cross-sectional area of said sight glass that is blocked by said radiation guide to facilitate viewing through said sight glass.

10. The assembly according to claim 8, wherein there is a plurality of said guide holes and a plurality of corresponding radiation guides.

11. The assembly according to claim 10, wherein the cross-sectional area of said sight glass that is unblocked by said plurality of radiation guides is greater than the cross-sectional area of said sight glass that is blocked by said plurality of radiation guides to facilitate viewing through said sight glass.

12. The assembly according to claim 8, wherein said leading end and said trailing end of said mounting member are planar surfaces parallel to one another.

13. The assembly according to claim 8, wherein said sight glass is clamped toward said trailing surface of said mounting member.

14. The assembly according to claim 8, wherein said mounting member includes a coarse flow duct system communicating with at least one spray port directed at said sight glass, whereby fluid is delivered for cleaning said sight glass.

15. The assembly according to claim 8, wherein said radiation guide includes a housing, and said exit end of said radiation guide includes a glass window fused to said housing.

16. The assembly according to claim 15, wherein said mounting member and said housing include a fine flow duct system communicating with at least one spray port directed at said fused glass window, whereby fluid is delivered for cleaning said fused glass window.

17. An illumination and viewing assembly comprising:

a mounting member including a leading end, a trailing end, an outer surface connecting said leading and trailing ends, a passage extending through said mounting member from said leading end to said trailing end, and a guide hole extending through said mounting member from said outer surface to said passage for communication with said passage;

10 a radiation guide having a radiation entry end and a radiation exit end, said radiation guide being arranged to extend from said radiation entry end through said guide hole into said passage and along said passage in the direction of said leading end, said radiation guide terminating at said radiation exit end;

a radiation source connected to said radiation entry end; and

20 a radiation detection unit in sealed adjacency to said trailing end of said mounting member, said radiation detection unit having a field of view through a cross-sectional area of said passage that is unblocked by said radiation guide.

19. The assembly according to claim 17, wherein there is a plurality of said guide holes and a plurality of corresponding radiation guides.

21. The assembly according to claim 17, wherein said leading end and said trailing end of said mounting member are planar surfaces parallel to one another.

22. The assembly according to claim 17, wherein said camera unit is clamped toward said trailing end of said mounting member.

23. The assembly according to claim 17, wherein said mounting member includes a coarse flow duct system communicating through said mounting member to at least one spray port directed at said camera lens, whereby fluid is delivered for cleaning said camera lens.

24. The assembly according to claim 17, wherein said radiation guide includes a housing, and said radiation exit end of said radiation guide includes a glass window fused to said housing.

10 25. The assembly according to claim 24, wherein said mounting member and said housing include a fine flow duct system communicating with at least one spray port directed at said fused glass window, whereby fluid is delivered for cleaning said fused glass window.